

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-040386

(43)Date of publication of application : 13.02.1998

(51)Int.Cl.

G06T 7/00

G06T 1/00

(21)Application number : 08-196398

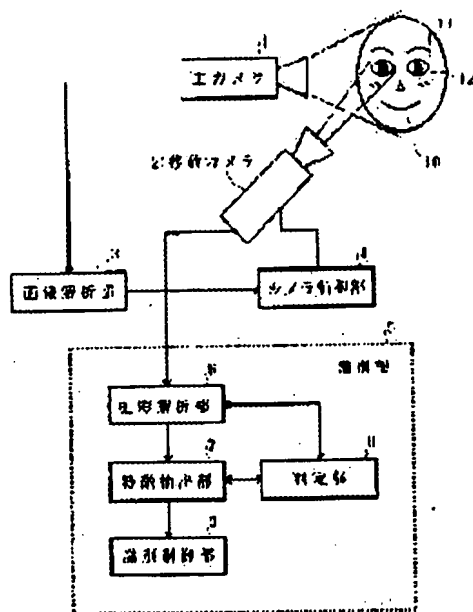
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(22)Date of filing :

25.07.1996

(72)Inventor : MIYASHITA SATOSHI

## (54) IRIS RECOGNITION SYSTEM



(57)Abstract:

**PROBLEM TO BE SOLVED:** To eliminate the necessity of an expensive camera, an optical processing system for zooming up, etc., and to reduce the cost of the system by photographing only a face by a camera and then photographing only eyes in the face by another camera.

**SOLUTION:** The image of the whole face 10 is photographed by a main camera 1. Namely a person approaching the front of the main camera 1 is detected and the face 10 of the person is photographed. Then the positions of eyes 11 are analyzed. Namely the positions of eyes 11 included irises 12 to be identified from the whole face 10 are analyzed based on the picture data of the photographed person's face. Then a camera control part 4 is driven and a moving camera 2 is focused on one eye out of both the eyes based on the position data of the eyes 11 to be analyzed and the image of the eye is photographed by the

camera 2. Then iris data are obtained. Thus the image of the right eye e.g. photographed by the camera 2 is analyzed by an iris analyzing part 6 to obtain the iris data of the right eye. A feature extracting part 7 extracts data characterizing the iris based on the iris data.

## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of

rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the iris recognition system for identifying an individual using the image information obtained by the iris.

[0002]

[Description of the Prior Art] A fingerprint is used as an approach for identifying an individual for many years. Moreover, the iris of an eye as well as a fingerprint is effective as information for identification, and the approach of the description acquisition is also introduced (JP,5-841166,B). Here, the technique of identifying an individual is carried by collating with a sample the description of the iris extracted at the process which illuminates the eye containing the iris and a pupil, the process which acquires the image of the iris and a pupil, the process which extracts the description based on the image of the iris, and its process. In this case, the image of the whole face is photoed with a camera and the location of an eye is recognized from the image of that whole face. After recognizing the location of an eye, a camera is turned to eyes of one of the two among both eyes, and only the eye is zoomed in. And an image with a detailed eye is photoed. The image of this photoed eye is analyzed and the data about the iris of an eye are acquired.

[0003]

[Problem(s) to be Solved by the Invention] However, there were the following technical problems which should be solved in the conventional iris recognition system. The magnitude of an eye is small, considering the magnitude of the whole face, and the iris is a part of eye further. Therefore, if the whole face tends to be photoed at first and then it is going to obtain an image with a clear eye, since it must have the optical system which includes an advanced image pick-up function like a zoom-in device in the camera itself, a camera becomes expensive.

[0004]

[Means for Solving the Problem] This invention adopts the next configuration, in order to solve the above point.

<Configuration> The main camera which is a system containing the camera which acquires iris data, and photos the image containing the whole face, It has the migration camera which photos only the part of the eye of a face, the image-analysis section which analyzes the location of an eye based on the image data of the face photoed with the above-mentioned main camera, and the camera control section which doubles the direction of the above-mentioned migration camera with the part of an eye based on the location data of the eye analyzed in the above-mentioned image-analysis section.

[0005]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained using an example.

<Configuration> Drawing 1 is the block diagram showing the example of the iris recognition system concerning this invention. This iris recognition system is equipped with the main camera 1, the migration camera 2, the image-analysis section 3, the camera control section 4, and the discernment section 5.

[0006] The main camera 1 photos the image containing the whole face. The migration camera 2 photos only the eye of the face. Beforehand, any camera fixes photographic coverage mostly, as shown in drawing. That is, it is a wide range object for photography, and the main camera 1 carries out the migration camera 2 to photography of the part of an eye, and its zoom-in device etc. is unnecessary. The image-analysis section 3 analyzes the location of an eye based on the location data of the eye acquired from the image containing the whole face photoed with the main camera 1. The camera control section 4 drives the universal head which carried the migration camera 2 based on the location data of the eye analyzed in the image-analysis section 3, and doubles a direction with the part of an eye.

[0007] The discernment section 5 has the iris analysis section 6, the feature-extraction section 7, the judgment section 8, and the discernment control section 9.

[0008] The iris analysis section 6 analyzes the image of the iris from the image of the eye photoed with the migration camera 2. The feature-extraction section 7 picks out the data by which the iris is characterized from the data analyzed in the iris analysis section 6. The technique is good by approach which was indicated by JP,5-841166,B. It judges of which eye the judgment section 8 acquires iris data based on the information acquired from the iris analysis section 6, and the information acquired from the feature-extraction section 7. For example, while was acquired clearly and only iris data may be acquired. The discernment control section 9 receives the data obtained from the feature-extraction section 7, collates with the sampled data accumulated beforehand, and identifies an individual.

[0009] <Actuation> Drawing 2 is the control flow chart of the migration camera of the iris recognition system concerning this invention. This control flow chart is for photoing the iris using two cameras. In step S1, the image of the face 10 whole is photoed with the main camera 1. That is, human being who approached in front of the main camera 1 is arrested, and the human being's face 10 is photoed. The location of an eye 11 is analyzed in step S2. That is, it analyzes where the location of the eye 11 containing the iris 12 made into the object of discernment from the face 10 whole based on the image data of people's face 10 photoed at step S1 is. In step S3, the camera control section 4 is operated and the migration camera 2 is set by eyes of one of the two among both eyes from the data of the location of the eye 11 analyzed at step S2. In step S4, the image of an eye is photoed with the migration camera 2. After that, iris data are acquired at step 5. In this way, the image of the right eye photoed with the migration camera 2 is analyzed in the iris analysis section 6, and the iris data of a right eye are obtained. The data by which this iris is characterized in the feature-extraction section 7 based on this iris data are taken out. In the process, the judgment section 8 inputs the information on being a right eye into the iris analysis section 6 and the feature-extraction section 7, and generates iris data. And it collates with the sampled data for specifying the individual accumulated in the discernment control section 9 in this iris data in the discernment control section 9. Consequently, an individual is discriminable.

[0010]

[Effect of the Invention] Thus, since it is carrying out as two cameras are used, only a face is photoed with one camera and only the eye in a face is photoed with one another camera, an expensive camera, the optical processor for zoom-in which accompanies the camera, etc. become unnecessary, and can aim at the cost cut of a system.

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[Translation done.]

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## TECHNICAL FIELD

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[Field of the Invention] This invention relates to the iris recognition system for identifying an individual using the image information obtained by the iris.

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## PRIOR ART

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## EFFECT OF THE INVENTION

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## TECHNICAL PROBLEM

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## MEANS

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control section 4, and the discernment section 5.

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[0009] <Actuation> Drawing 2 is the control flow chart of the migration camera of the iris recognition system concerning this invention. This control flow chart is for photoing the iris using two cameras. In step S1, the image of the face 10 whole is photoed with the main camera 1. That is, human being who approached in front of the main camera 1 is arrested, and the human being's face 10 is photoed. The location of an eye 11 is analyzed in step S2. That is, it analyzes where the location of the eye 11 containing the iris 12 made into the object of discernment from the face 10 whole based on the image data of people's face 10 photoed at step S1 is. In step S3, the camera control section 4 is operated and the migration camera 2 is set by eyes of one of the two among both eyes from the data of the location of the eye 11 analyzed at step S2. In step S4, the image of an eye is photoed with the migration camera 2. After that, iris data are acquired at step 5. In this way, the image of the right eye photoed with the migration camera 2 is analyzed in the iris analysis section 6, and the iris data of a right eye are obtained. The data by which this iris is characterized in the feature-extraction section 7 based on this iris data are taken out. In the process, the judgment section 8 inputs the information on being a right eye into the iris analysis section 6 and the feature-extraction section 7, and generates iris data. And it collates with the sampled data for specifying the individual accumulated in the discernment control section 9 in this iris data in the discernment control section 9. Consequently, an individual is discriminable.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the iris recognition system concerning this invention.

[Drawing 2] It is the control flow chart of a migration camera.

[Explanation of agreement]

- 1 The Main Camera
- 2 Migration Camera
- 3 Image-Analysis Section
- 4 Camera Control Section
- 5 Discernment Section
- 6 Iris Analysis Section
- 7 Feature-Extraction Section
- 8 Judgment Section
- 9 Discernment Control Section
- 10 Face
- 11 Eye
- 12 Iris

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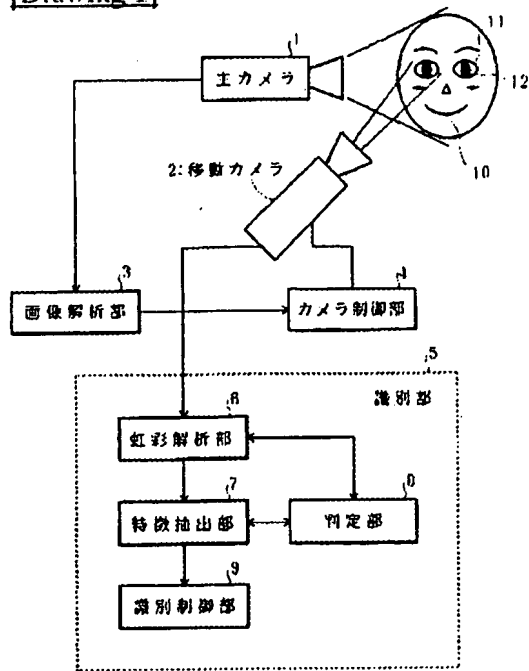
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**DRAWINGS**

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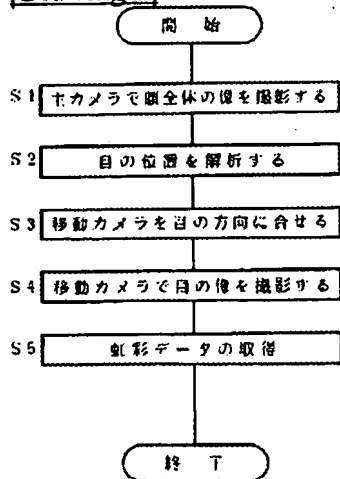


[Drawing 1]



本発明に係る虹彩認識システムのブロック図

[Drawing 2]



移動カメラの制御フローチャート

[Translation done.]